TVA Ten Year Business Outlook

July 22, 1997

The Tennessee Valley Authority
Ten Year Business Outlook

TVA's mandate includes providing an ample supply of power to the people of the Tennessee Valley at the lowest feasible rates, promoting the economic development of the region, and integrating the activities of resource management. While TVA is sensitive to the totality of its mission, this Ten Year Business Outlook is primarily focused on positioning the electric power operations to meet the challenges TVA will face in the coming restructured marketplace.

Unlike a privately owned utility, TVA has no obligation to create profit for stockholders. But TVA has responsibilities to a variety of *stake*holders, and those responsibilities have evolved beyond the original mandate of the TVA Act to accommodate new congressional initiatives and the changing needs of stakeholders. TVA must reassure its customers and, in turn, the citizens of the region, that it will always be a source of competitively priced power. TVA must assure the Congress of the United States that it will not allow its operations to become so financially fragile that its ability to operate solely through the use of revenues generated from power sales is threatened. TVA must assure investors that TVA is a soundly operated business that will continue to be competitive and not require government assistance in meeting its debt obligations. And TVA must assure its employees that it will continue to be a thriving, competitive business offering opportunities for individual growth and challenge.

These assurances were met more easily and predictably in the regulated environment of the past sixty years than will be possible in the future. As the electric utility industry moves toward restructuring, the industry environment will become increasingly competitive and volatile. The margin for error will become less tolerable. Reaction times will be shorter. Predictability will diminish.

In anticipation of these future challenges, TVA has taken a number of steps, including:

- Ending the nuclear construction program, thereby substantially reducing the level of capital expenditures;
- Reducing employment levels by half and increasing the productivity of the workforce through reductions in force, early-out incentives, training and education;
- Establishing a cap on debt well below the statutory ceiling authorized by Congress;
- Improving operating efficiencies of its fossil, hydro and nuclear plants to among the best in the nation; and
- Adopting an Integrated Resource Plan to comprehensively evaluate current and future energy needs, and creating a TVA Strategy Team to assess future competitive conditions.

As a continuation of these efforts, TVA has now developed a long-range financial and strategic plan designed to accomplish several interrelated objectives:

- First, TVA's total delivered cost of power must be reduced to a level consistent with the forecast of the future market price of power surrounding TVA's service territory.
- Second, TVA must alter its cost structure from its currently rigid, high fixed-to-variable cost relationship to a structure that is more flexible and better able to adjust to a volatile marketplace.
- Third, TVA must continue to build customer allegiance and satisfaction for a competitive environment by developing opportunities for mutual support and partnership.

The purpose of this plan is to address each of these objectives in an interrelated manner to assure success by the end of the 10-year time frame. This will require an appropriate balance between TVA's need for financial flexibility, adequate cash flow, minimum required income levels, and competitive power rates. Naturally, future events can upset these expectations and lead to course corrections, but the plan has been built on assumptions that are considered conservative, yet realistic, based upon today's knowledge and predictions for the future. Ideally (and possibly) the goals of the plan will be achieved sooner than the 10-year planning time frame. In any case, the plan is not a static document. It will be reviewed, critiqued and, as necessary, adjusted at least on an annual basis.

The Future Price of Power

The single most important prediction in this planning process is the market price of power in the future. TVA and its customers (and their customers, in turn) must be confident that the TVA price of power in the future is competitive with available alternatives.

In developing the prediction for the expected market price of power in the future, TVA used several methods, but the two methods discussed below bound the range. The first method projects the cost of new generation and is based on the economic theory that the price of any product will gravitate over time to the cost of new production. In the case of electric energy, new production in the near-term will likely be from gas production units, so the dynamics of the gas industry are of utmost importance to any prediction of the future. A reasonable set of assumptions of gas prices, capital costs, and operating efficiencies develops a price that could be as low as 3.0¢ per kilowatt-hour as a sustainable delivered wholesale cost of power (including generation and transmission) to the distributor.

A second method of projecting future prices develops from projections of regional demand and supply for utility consumption. By using data from the North American Electric Reliability Council (NERC) database, the TVA Strategy Team developed a regional rationale for projecting the market price of power. The team considered both projected regional supply and demand for the 300,000 megawatt marketplace in the eastern United States. The result of applying this methodology was a projection of an all-in energy, capacity and transmission wholesale price in 2007 of 3.7¢ per kilowatt-hour delivered to the distributor.

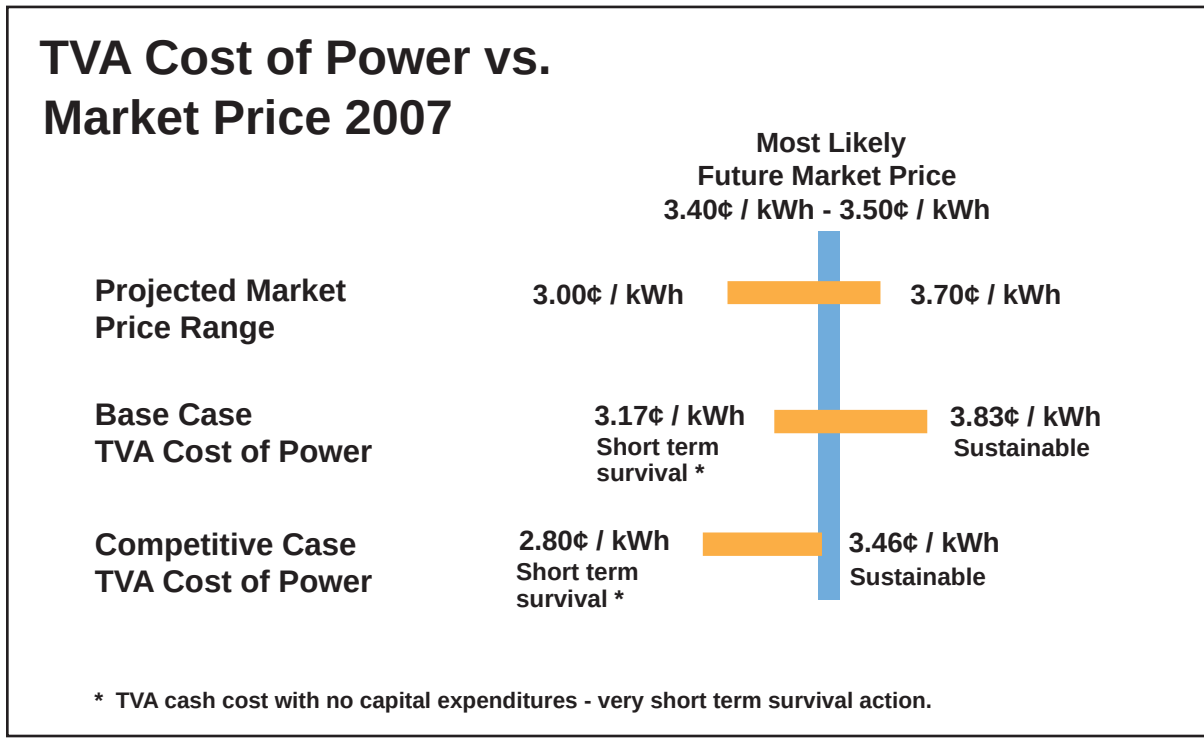
Relying on these analytical methods, the plan assumes a market price for delivered power at the end of the plan period of 3.4¢ - 3.5¢ per kilowatt-hour. This price was judged to be a conservative, most likely outcome from the projected range, bounded by 3.0¢ per kilowatt-hour on the low end and 3.7¢ per kilowatt-hour on the upper end.

TVA's expected 1998 cost of power is 4.11¢ per kilowatt-hour. If the projection of 3.4¢ - 3.5¢ per kilowatt-hour materializes, TVA's price that it must charge to cover costs, absent any changes to its cost structure, would likely be noncompetitive in the marketplace 10 years into the future. Given the uncertainties surrounding the future of the industry and the volatility in the assumptions that affect the projections, TVA believes that the prudent approach to planning for the future is to achieve a cost structure that will allow TVA to price its power competitively under this most likely scenario.

To compare TVA's "base case" projected cost of power in 2007 to the results above, TVA conducted an analysis that considered expected growth in sales, potential cost reductions, and reasonable assumptions for fuel, labor, interest and other cost components. The outcome of that analysis was an estimated break-even, "sustainable" delivered cost of power of 3.83¢ per kilowatt-hour in the year 2007. On a

very short-term basis, power could be sold for as little as 3.17¢ per kilowatt-hour, but this lower cash-cost selling price, while covering operating costs, would provide no funds for reinvestment to maintain the infrastructure of the business.

As previously stated, the first purpose of this integrated plan is to develop a "competitive case" for achieving a sustainable, delivered cost of power that is consistent with the forecast of 3.4¢ - 3.5¢ per kilowatt-hour for market prices in 10 years. The chart below illustrates the comparison of that market price with TVA's cost of power in 2007, based on implementation of this plan. The individual actions required to achieve these results are discussed in subsequent sections.



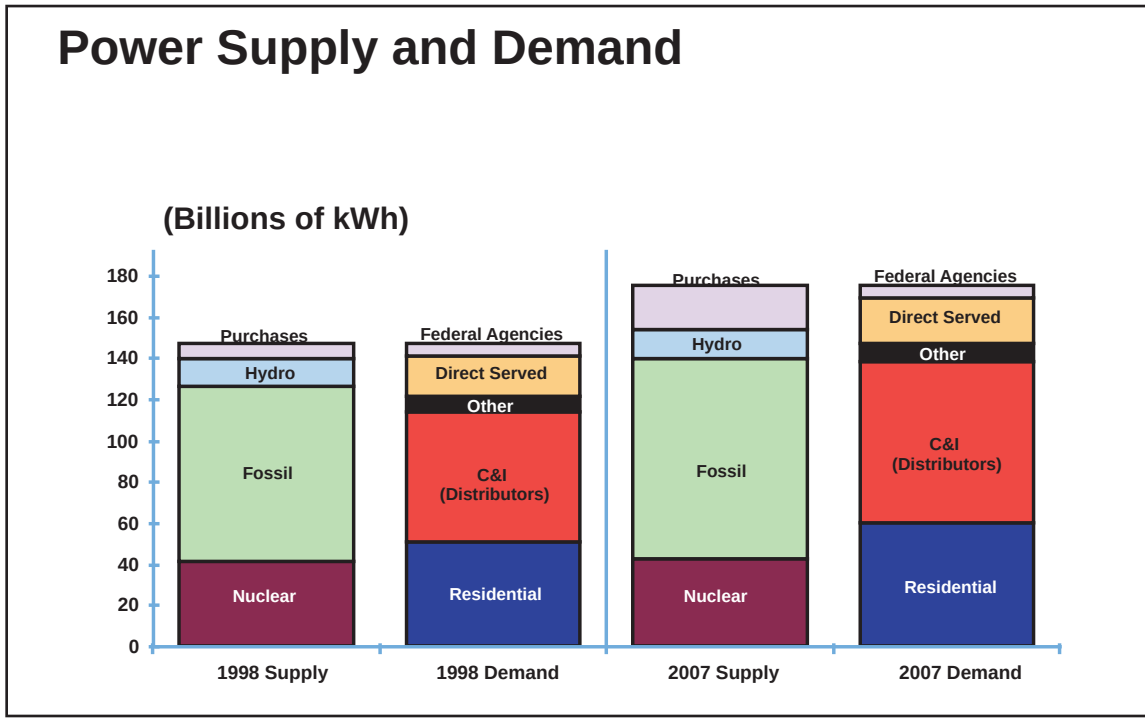
Outlook for Growth in Supply and Demand

Power requirements for TVA are projected to grow at a slightly lower rate than the economic growth of the Valley. TVA projects that economic growth in the Valley will continue at a rate similar to that of the national economy, about 3.1% per year on average.

The combined growth in demand of distributor and directly-served customers causes TVA's native load requirements to increase from 147 billion kilowatt-hours in 1998 to 175 billion kilowatt-hours in 2007 or 2% average per year. This plan assumes that distributors will continue to purchase all of their electric power requirements from TVA and, furthermore, that there will be no significant erosion of demand by wholesale and/or retail end-users accessing alternative suppliers.

TVA's current mix of capacity is comprised of 19.9% nuclear, 53.1% fossil, 19.0% hydro, and 8.0% combustion turbines. The same relative relationship should exist in 2007, except that the fossil units are predicted to operate at higher capacity factors and some portion of the production mix in 2007 will come from new sources.

TVA is dealing with its power needs in innovative ways — by continuing to meet the needs of its customers while building flexibility into its supply options. The plan assumes that new sources of generation will evolve from both power purchases and improvements to existing capacity. This strategy will provide TVA with operating flexibility and conservation of capital dollars balanced against supply risk.



Cost Control / Cost Reduction Strategies

TVA spends about $3 billion a year on fuels, products and services. By lowering the cost of these controllable expenses, TVA will improve its operating results, cash flow and cost to produce power.

Fuel

Fuel, excluding purchased power, accounts for 21.2% or .87¢ per kilowatt-hour of TVA's operating expense and is the major variable component of the cost structure. Fuel types include coal, nuclear, and natural gas. TVA's blended fuel cost is projected to escalate by 1.7% over the plan period.

Coal is by far the largest portion of fuel expense, amounting to 82.7% of fuel costs or .72¢ per kilowatt-hour. TVA expects to achieve the lowest possible cost for coal not only by focusing on obtaining a low delivered cost, but also through imposing economic inventory levels, reducing fuel-handling expense, increasing by-product utilization, and improving coal quality, which leads to increased plant reliability. TVA continuously evaluates potential fuel markets that may expand the current supply options.

Nuclear fuel is 16.3% of TVA's fuel cost or .14¢ per kilowatt-hour and is projected to decline over the plan period. Although market prices for new purchases are expected to remain relatively constant over the plan horizon, TVA currently has on hand relatively high priced inventory that it expects to deplete by 2005. Thereafter, TVA will enjoy market prices. TVA's strategy is to purchase fuel as it is needed to capture the lower market prices and to gain flexibility in the quantities purchased.

Although technically not a fuel cost, the plan assumes that purchased power will increase to approximately 10% of the cost of production by 2007. Since the price of purchased power will be largely influenced by gas prices, purchased power may be considered, in some sense, a substitute fuel. As mentioned above, reliance on this level of purchased power is both an advantage and a risk that must be carefully weighed as market conditions change.

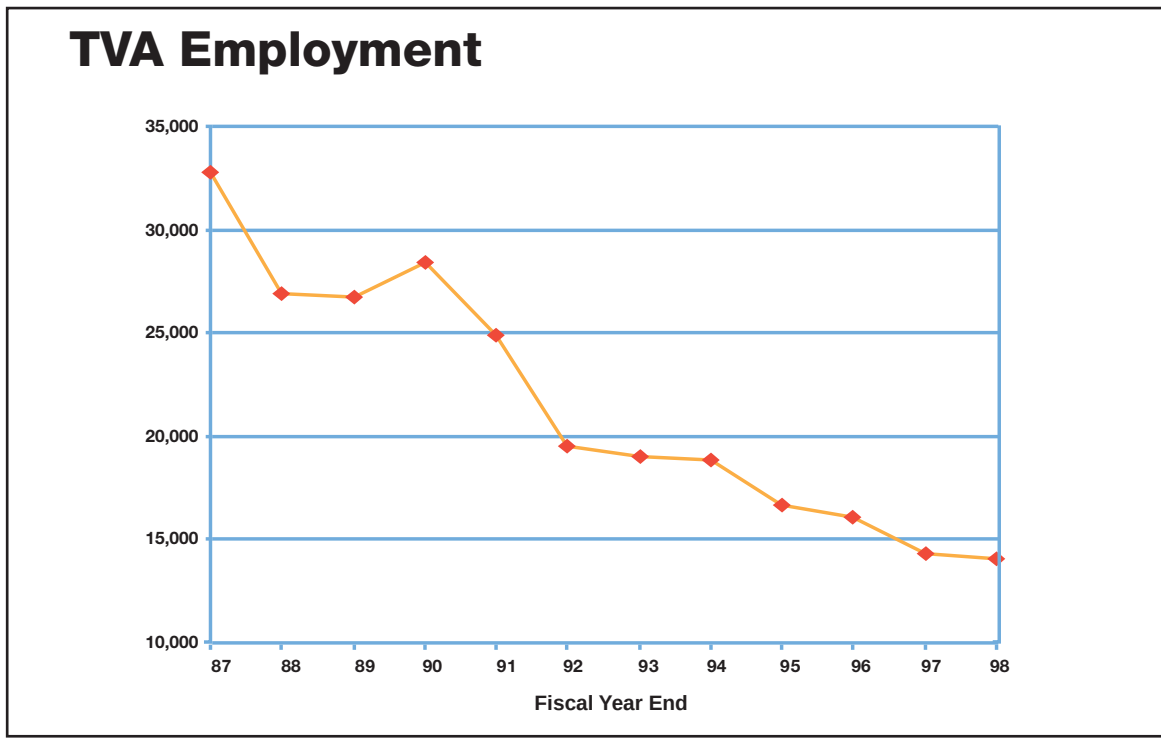
Supply Chain

TVA approaches the procurement of goods and services through a comprehensive, life-cycle program strategy that begins with the need for the product, progresses through strategic sourcing, and ends with utilization or disposition. This approach to supply management, initiated in 1996, is beginning to realize significant cost savings. Over the plan period, it is expected that TVA will save, on average, $50 million per year from this new way of doing business and that, by continuing to challenge the purchases and use of products and services in the future, more savings can be gained while increasing efficiency and maintaining quality.

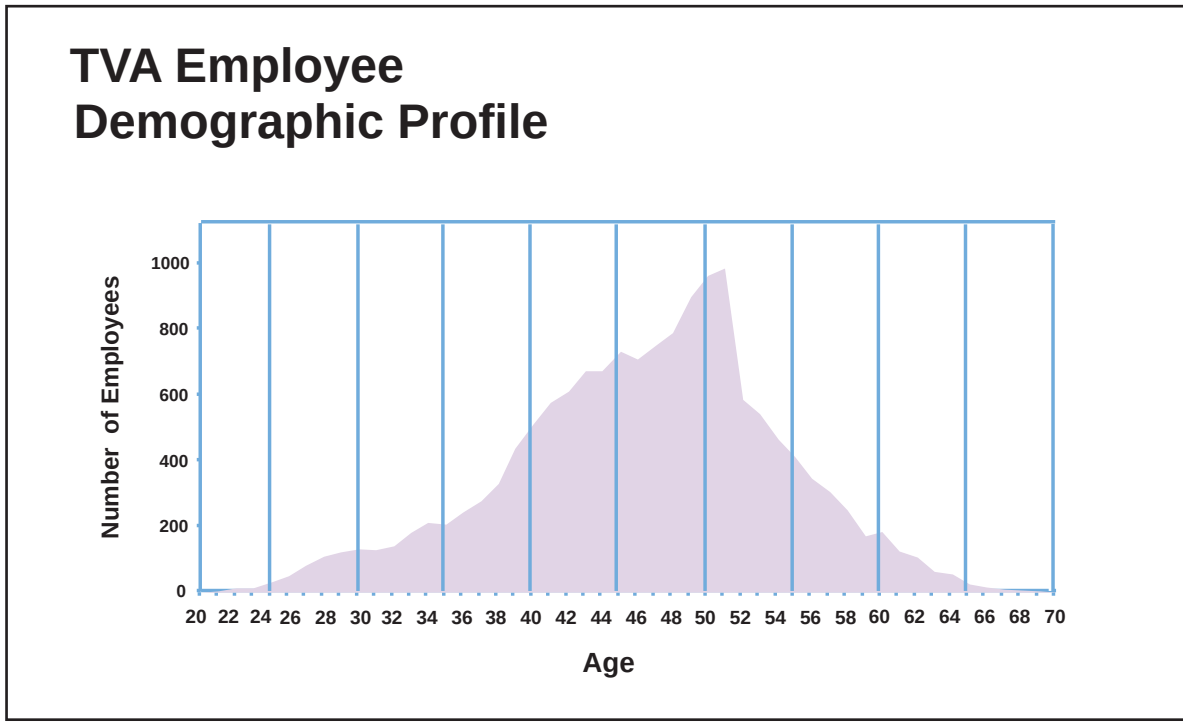
Labor

TVA realizes that new skills will be required to meet changing customer demands and that the organization must continue to gain efficiencies through process improvements and innovative work structures. Labor and benefits costs are 17% of TVA's total costs. TVA is challenged to develop a labor profile that provides for efficient operations and the right level of administrative support while maintaining the highest levels of quality and reliability.

To develop such a labor profile, TVA has commissioned workforce competitiveness studies that call for a reduction in current employment levels from 14,960 at June 30 to 14,275 by September 30, 1997. These reductions will decrease TVA's labor expense, but, more importantly, through realignments and the creation of shared services, the reductions will enhance TVA's flexibility to respond to a changing environment. TVA employment at September 30, 1997 will be 43% of the level in 1987.



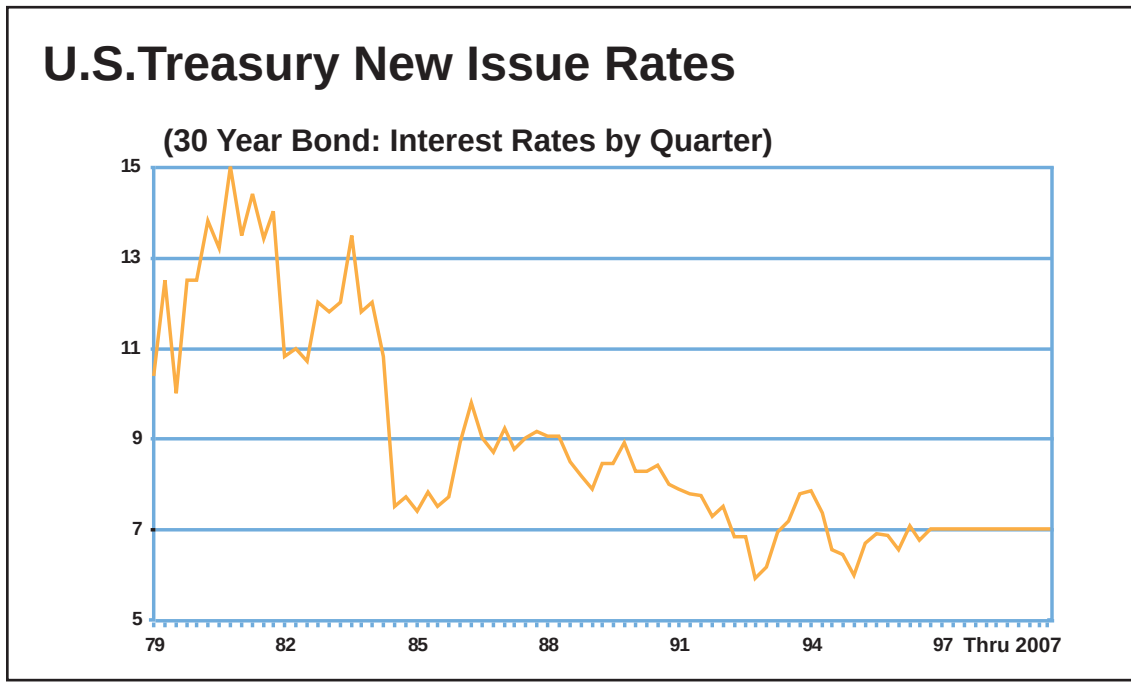
Efficiencies gained through continual process improvements and innovative work structures may reduce the labor content of production in the future. It has been assumed that the demographics of the present workforce will accommodate those reductions through attrition. In fact, because of the current demographic profile, one of the most serious challenges that TVA may face in the latter years of the plan may well be to secure enough employees with the right skill mix to fill strategic positions throughout the organization.



Debt and Interest

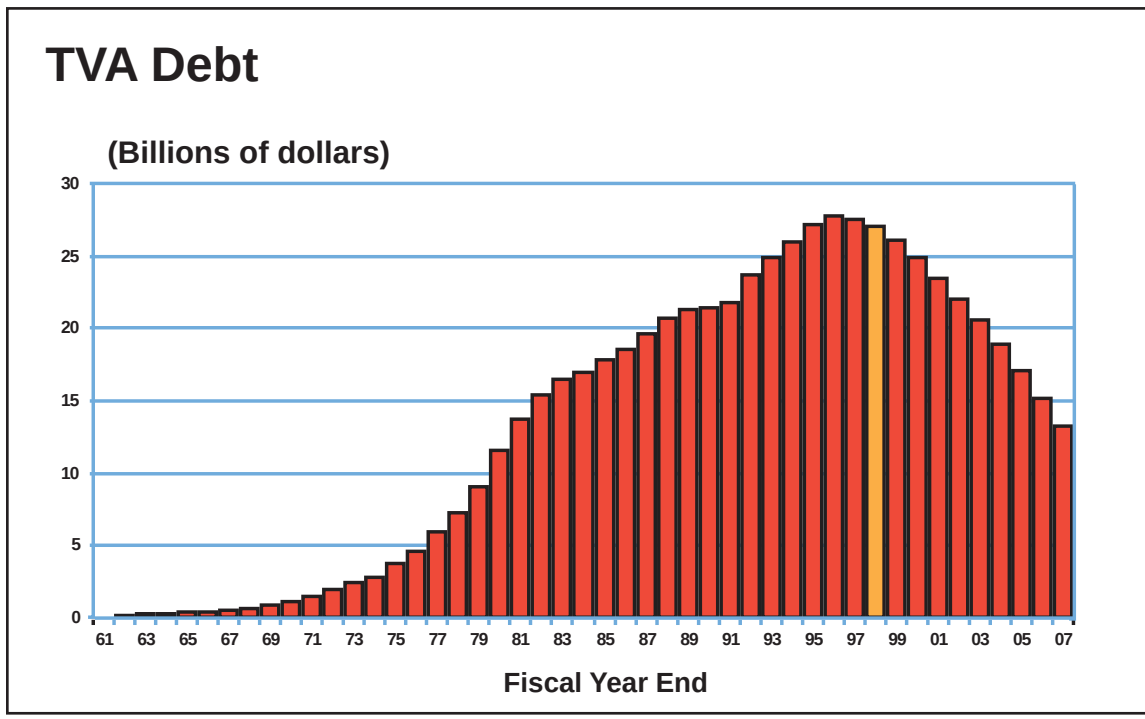
Interest expense now totals $2 billion per year or 34% of the total cost of power. This is the cost component that, more than any other, challenges TVA's ability to provide power at projected market rates in the future.

TVA, as a "triple A" rated borrower, issues debt at interest rates that are very close to U.S. Treasury borrowing rates. Over the planning period, it is assumed that TVA's long-term interest rates to refinance maturing debt will average 7%. While this is an aggressive assumption compared with the long-term history of U.S. Treasury rates, it is a reasonable expectation in light of current economic stability. With this assumed interest rate environment, TVA's refinancings can maintain, but not significantly improve, the average interest rate on its debt portfolio.



The only major alternative to reduce TVA's interest expense is to reduce the amount of debt outstanding. On average, for each $500 million of debt reduction, interest expense will decline by approximately $35 million, reducing the cost of power by .02¢ per kilowatt-hour. Naturally, since each dollar of reduction in interest expense translates to an additional dollar of debt retirement in the future, the compounding effect will be even more significant by the end of the plan period.

In order to attain the competitive delivered price of power by the end of the plan period, TVA projects that, combined with other cost controls and efficiency improvements, it will need to reduce interest expense, and therefore debt, to approximately one-half of current levels. By implementing this plan, TVA will, at the end of the plan period, have its lowest level of debt since 1981.

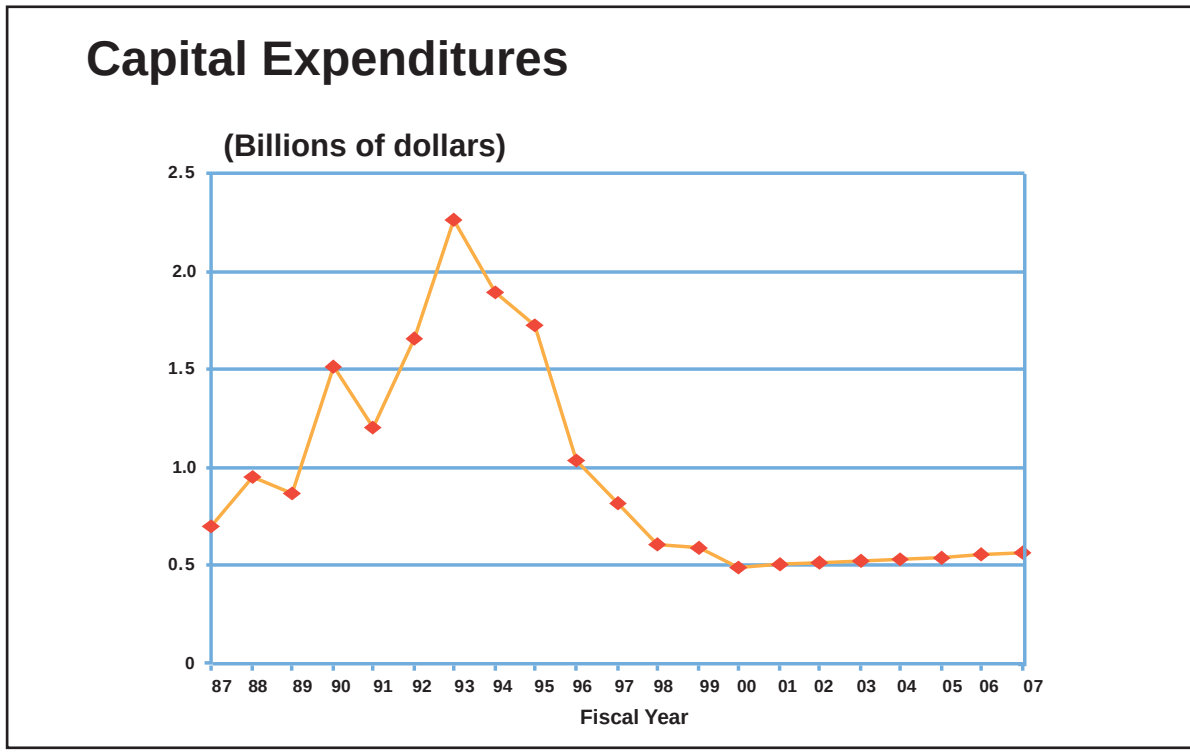


Capital Expenditures

Capital expenditures use cash and therefore reduce the funds available to pay down debt. Historical levels of capital spending have been in the range of $1 billion to slightly over $2 billion annually, peaking in the early 1990s because of the costs of completing nuclear units. Since the Board's decision in late 1994 to cease spending for the construction of new nuclear capacity beyond completion of Watts Bar, spending levels have been reduced primarily to the level necessary to maintain the operating units and transmission system.

During the planning period, capital expenditures for fossil operations are targeted to maintain existing facilities but provide no response to the potential expansion of clean air requirements. To the extent that new clean air regulations require additional investments and thereby increase TVA's delivered cost of power, the targeted cost of power, as well as the projected market price of power in 2007, may increase since other utilities would be similarly affected.

Capital spending for the nuclear program is projected to decline further, with investments primarily targeted toward reliability improvements. Projections for the hydro program include the completion of the modernization program initiated in 1992 to both rehabilitate and update 88 hydro units by 2004. Investments in the transmission system are targeted for reliability, replacement of obsolete equipment, and system capacity/load growth.



The capital projections do not include any projects for new generation. As discussed in the supply and demand section, TVA will need additional power to meet the demand resulting from growth in the Valley over the next 10 years. The decision whether to purchase the power or increase existing capacity will be made at the appropriate time, based on the economics of the projects and the level of certainty surrounding the load forecasts. To the extent that TVA expands existing capacity rather than purchases power, the expense for purchased power will decline, and production expense, depreciation, and interest expense will rise, but to a lesser extent.

Other Cost Improvement Initiatives

In addition to the cost reduction strategies described above, TVA will also pursue additional cost reduction initiatives during 1998, with the expectation that these will contribute up to $200 million per year thereafter.

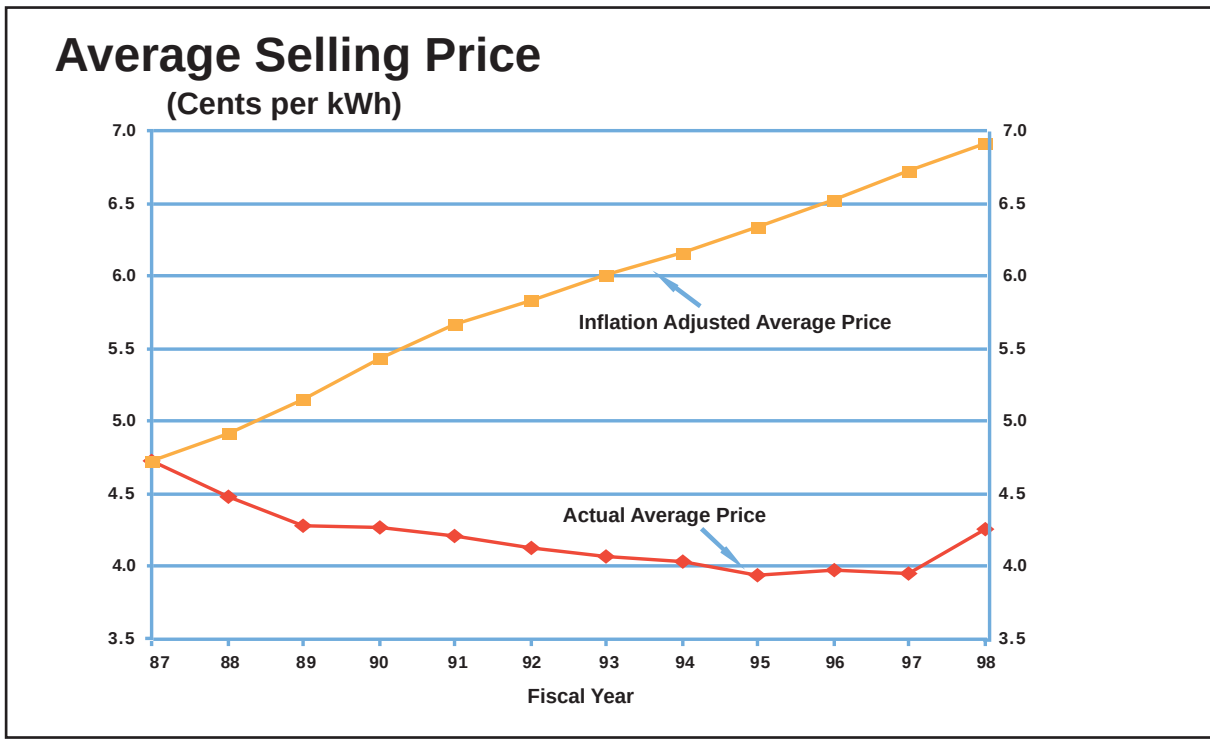
Several major initiatives will be undertaken to improve TVA's interest expense beyond those objectives associated with debt reduction. One such initiative will be to elicit the support of Congress and the Administration to permit the prepayment without penalty of the $3.2 billion owed to the Federal Financing Bank. This debt carries an interest rate of 9.67%, which is substantially above market rates. If TVA were permitted to repay this debt in full and refinance it at market rates, the interest savings would be almost $100 million every year. TVA will also develop additional debt exchange offers that provide opportunities for interest rate reductions.

Initiatives to improve operating costs will continue to be developed. Within the fossil organization, additional opportunities will be pursued for utilizing fuel byproducts. Idle or non-utilized power system property and equipment not vital to future operations will be disposed of. Employee and management teams will pursue continual process improvement initiatives, benchmarking to the best of the industry.

Selling Price

Consistent with the TVA Act's mandate, power rates must be as low as feasible while, at the same time, adequate to meet the power system needs and contractual covenants with TVA's bondholder investors. Through a variety of management initiatives, TVA has successfully avoided raising electric prices for 10 years. During that decade, while overall inflation in the economy increased all prices an average of 2.6% per year or 44.5%, the average revenue per kilowatt-hour received by TVA showed a steady decline from 4.72¢ in 1987 to 3.95¢ in 1997 — a 16.3% decrease.

In order to meet the objectives of achieving a competitive cost of power by the end of the plan period, while keeping prices competitive during the interim, this plan recommends that TVA implement a price adjustment to generate an additional 5.5% in its electric revenues. This action will increase TVA's average price of power from a projected 4.0¢ to 4.22¢ per kilowatt-hour in 1998.



Beyond 2007, TVA will have successfully reduced its cost to produce power to the projected market price of 3.4¢-3.5¢ per kilowatt-hour through implementation of the combined actions proposed in this plan, and will be able to reduce its selling price to that competitive level.

While this price increase is necessary for TVA to remain competitive in the future, TVA cannot afford to overlook the potential negative effect this action might have on some crucial components of the industrial sector. If growth in the manufacturing sector is jeopardized, the price increase required to meet the financial objectives of the plan would have to be higher. In the past, TVA, in partnership with its power distributors, has successfully stimulated industrial and employment growth in the region, resulting in increased electric sales. The Manufacturers' Credit Program now in effect is one important way in which this has been achieved.

To avoid negative price effects on all consumers, TVA proposes to expand the existing Manufacturing Credit Program. Large industrial manufacturing consumers (those with loads over 5 megawatts) have received these credits in the past. TVA proposes that an incremental manufacturing credit be implemented to offset the impact of the 5.5% revenue increase. Furthermore, TVA proposes that these incremental credits be made available to extend to qualified companies with firm loads above 1 megawatt. The incremental credit program will be offered to distributors on an optional basis.

In an effort to have all consumers better cover their fair share of system costs, TVA plans to increase the transmission cost coverage component in the lowest-cost interruptible power rates, such as Economy Surplus Power (ESP). The component will include a network transmission charge equivalent to $1.21 per kilowatt-month to better reflect associated network transmission costs. This reflects the industry-wide trend toward unbundling transmission charges. Charges for other types of interruptible power, such as interruptible standby power, will also be increased. According to the results of competitive analyses performed by TVA, these prices will still enable industries to remain competitive in terms of electric rates.

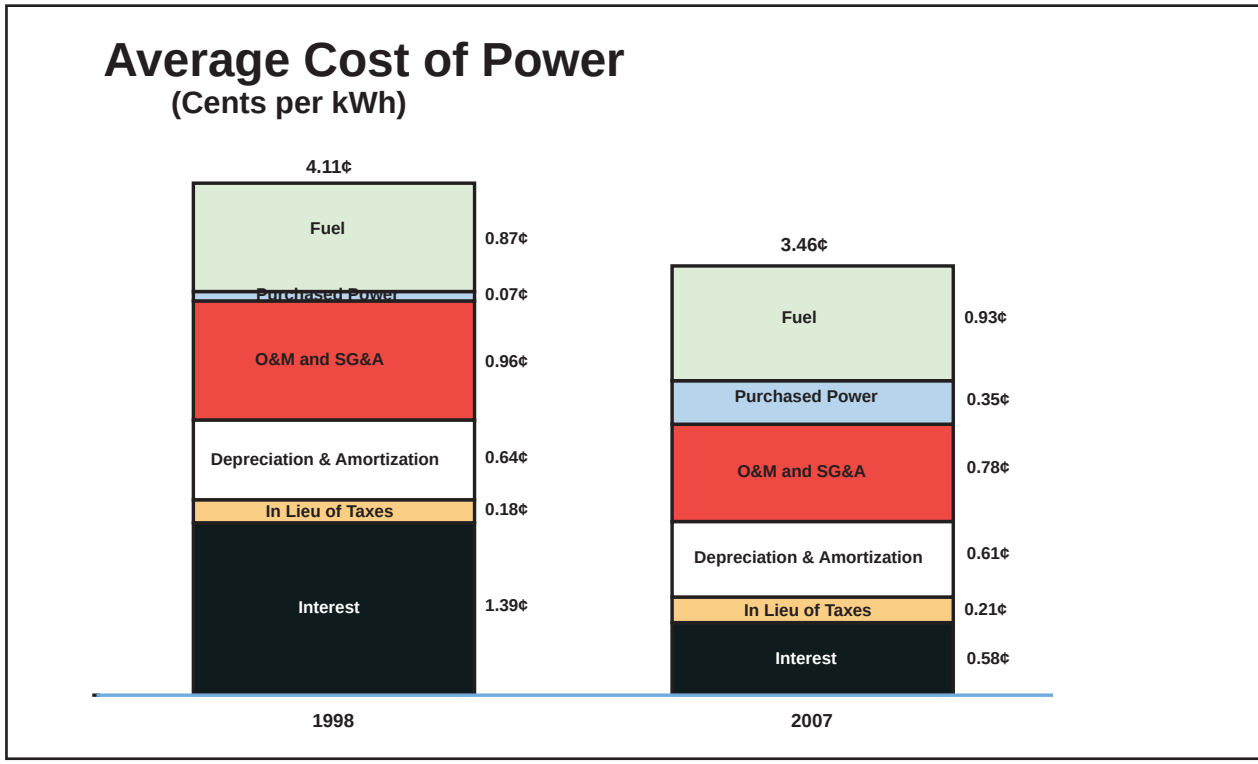
Customer Relations

In anticipation of restructuring, many of TVA's customers also are seeking a more flexible position from which to respond to competitive challenges. TVA must work closely with these customers to develop pricing structures that provide better and more opportunities to control their costs. TVA plans to work with distributors that want more contract flexibility to meet their needs, while not shifting the cost obligations of these arrangements to other customers.

TVA proposes to offer distributors a wholesale power contract amendment that would, beginning five years after the amendment, change the contract from a rolling 10-year term to a rolling 5-year term. In addition, TVA proposes to offer a new program to permit qualifying customers greater than 1 megawatt to be billed under real-time pricing, which will provide the opportunity to the customer to reduce costs by adjusting use patterns.

Results of Plan Initiatives, Recommendations and Conclusion

The successful implementation of the cost reductions, rate actions, and other cash flow improvements will result in a cost structure as shown below. By 2007, TVA's total delivered cost of power will have been reduced to 3.46¢ per kilowatt-hour. It is this cost reduction that makes it possible for TVA to reduce its average selling price at the end of the planning period to the forecast market price of power.



In addition to reducing TVA's total cost of power from 4.11¢ to 3.46¢ per kilowatt-hour, these initiatives will have significantly altered TVA's cost structure in terms of fixed versus variable expense. Interest expense, the largest fixed cost today, will be less than one-half its current level by 2007. Fuel expense and purchased power, which are principally variable costs, amount to 0.94¢ today, or 23% of total costs, and are projected to be 1.28¢ in the future, or 37% of total costs.

As stated at the outset, TVA's mandate is to provide power to the people of the Tennessee Valley at the lowest feasible rate while, at the same time, promoting the economic development of the region. This long-range plan remains faithful to this mandate while accomplishing several interrelated objectives. Furthermore, implementation of these proposals will provide necessary income for TVA to meet its contractual covenants with its bondholders related to earnings during the five year period ending in 1998.

It is recommended that the Board approve the implementation of all of the actions discussed in this plan, but most importantly the actions related to prices. By doing so, over the long term, TVA will be able to balance its need for financial flexibility, adequate cash flow, minimum income levels, and competitive power rates. Furthermore:

- The delivered cost of power to TVA customers **will be reduced** to a level consistent with the forecast of the market price of delivered wholesale power in ten years.
- TVA **will have altered** its cost structure to one that is more flexible based on a relationship of fixed-to-variable costs.
- TVA's customers **will have more flexibility** through a variety of contract initiatives that are responsive to their competitive needs in the decade ahead.

Tennessee Valley Authority
Ten Year Business Outlook
Power Program Only

2007 Goals:

- Reduce Cost of Power to . . . . . 3.5 ¢/kWh
- Reduce Debt by Half to . . . . . $13.8 Billion
- Build Customer Allegiance and Satisfaction
- Gain More Flexible Cost Structure

Past Actions:

- Stopped Nuclear Construction
- Capped the Debt
- Reduced Employee Headcount
- Improved Operations:
  - All Five Nuclear Units On Line
  - Fossil and Hydro Plants Operating at Record Levels

Current Actions:

- Reduce Employee Headcount:

Career Transition Services	348
Corporate Support Staff	456
Operations	268

• Increase Revenue from Firm Power by 5.5%	$ 325 Million
• Improve Procurement Practices	50 Million
• Add Transportation Charge on ESP	35 Million
• Generate Other Cash from Power Business	66 Million
Apply Funds to Debt Reduction	$ 476 Million

- Limit Capital Expenditures to . . . . . $ 595 Million
- Modify 10-year Customer Contracts to 5/5

Future Actions:

- Negotiate Customer Contract Modifications for Flexibility
- Identify $200 Million of Incremental Cash Savings:
  - Prepayment of FFB Debt
  - Further Debt Refinancings
  - Additional Cost Savings
  - Reduction in Capital Expenditures